EG&G

RESPONSE TO DOE COMMENTS OF 4/23/1991

## GENERAL RESPONSE

It appears that these comments were provided either before the 11 April 1991 meeting with EPA and the State or were prepared by someone not in attendance at the meeting. Many of the comments are no longer relevant, based on general understandings reached at this meeting. Much of the detail on how the pathways model will be used is inappropriate at this stage, but should be developed in the plan developed at the end of Task 1.

**Comment:**

1. Section 9.1, p. 9-1, paras. 1 & 2: The first sentence in each of these two paragraphs present somewhat inconsistent objectives and goals for the EE. Please review.

**Response:**

First sentence in Para. 2 has been deleted. First sentence in Para. 1 has been revised to read "...addressing potential impacts and risks to the biotic environment (plants, animals, microorganisms)...".

**Comment:**

2. Section 9.1, p 9-1, para. 1: Define "environment" in the first sentence. Add "impacts" to "addressing risks to the..."

**Response:**

See preceding response.

**Comment:**

3. Section 9.1.1, p. 9-2, para. 1: The "coordinated approach with OUs 1 & 2" is not evident or elaborated on later in the EEWP.

**Response:**

The approach is being coordinated as part of the implementation of the field sampling efforts for OUs 1, 2, and 5. On the basis of the joint meeting on 11 April 1991, current plan revisions to OU1 and OU5 will address this to the extent possible.

**Comment:**

4. Section 9.1.1, p. 9-2, para. 3: The Task 1 efforts should have already been accomplished as part of the RI scoping.

   The first sentence in this paragraph indicates that DOE regards the EE efforts as outside the scope of the OU5 RFI/RI efforts. This is not correct.

   The Data Quality Objectives cannot be defined in Task 1 because the data needs have not yet been identified.

**Response:**

Based on the April 11 meeting with DOE and EPA, the Task 1 efforts as outlined in this Work Plan are appropriate.

Text corrected.

Phase I DQOs will be developed in Task 1 to the extent possible. According to EPA DQO guidance documents, several steps in the first phase of the DQO process can take place prior to identifying data needs or gaps. These include such steps as defining the objectives of the data collection efforts and identifying and involving data users.

**Comment:**

5. Section 9.1.1, p. 9-2, para. 4: The majority of this work should have already been conducted as part of the RI scoping. Much of what is included under Task 2 is generally considered part of the conceptual model development. We suggest combining Task 1 with all or part of Task 2, since they are obviously related.

   The use of the term "preliminary risk assessment" is very questionable. What is being called "preliminary risk assessment" is really "conceptual model development." We question the loose use of the term "preliminary risk assessment" and suggest the term not be used at least in this context. For example, a risk assessment is not generally used to identify contaminants of concern.

**Response:**

We believe the efforts as outlined in Tasks 1 and 2 are appropriate. The title for Task 2 will be changed to "Conceptual Model Development".

According to the EPA Vol. II guidance document, the first step in conducting an environment risk assessment or environmental evaluation (the terms are synonymous) is to identify the contaminants of concern to biota.

**Comment:**

6. Section 9.1.1, p. 9-1, para. 1: Describe the types of "quantitative data on community composition in terrestrial and aquatic habitats" to be developed from the ecological field surveys.

   The "update(ing) knowledge of site conditions" should really be "updating the conceptual model."

**Response:**

See SOPs and Section 9.3.4. of this Work Plan.

The field surveys are being conducted to update knowledge of site conditions as well as provide site-specific data for the conceptual model.

**Comment:**

7. Section 9.1.1, p. 9-4, para 2: It would appear that some level of toxicity assessment needs to be conducted before contaminants of concern can be identified. This paragraph indicates that the contaminants of concern are identified before a toxicity assessment is conducted. Is this all consistent?

**Response:**

Yes. As part of the contaminants of concern selection process, the chemicals are evaluated with respect to various physical and chemical properties, including, bioconcentration factors, toxicity constants, water solubility, organic partition coefficient, vapor pressure, etc. Once contaminants of concern are selected, a detailed toxicity assessment is conducted in conjunction with the exposure assessment to determine the potential site-specific effects on receptor species.

**Comment:**

8. Section 9.1.1, p. 9-4, para. 3: The "ecological field investigation" in the first sentence should be "ecological field survey."

**Response:**

Text corrected.

**Comment:**

9. Section 9.1.1, p. 9-4, para. 4: It is unclear why "characterization of the risk or threat of OU5 contaminants to receptor populations and habitats" is being addressed at this stage of the assessment. It does not appear data are adequate at this stage to characterize risks. Why not wait until the end of the Phase I process.

**Response:**

See section 9.2.7.

The process presented in this Work Plan is both phased and iterative, as mode data are collected, the conceptual model and risk or contamination characterization are refined.

**Comment:**

10. Section 9.1.2, p. 9-6, para. 2: The indications are that all potential contaminants of concern to the EE are included in Tables 2-5 and 2-6. Is this true? If not, how will the EE-specific contaminant data needs to be incorporated into the Phase I RI abiotic sampling program?

**Response:**

These tables present a summary of information presented in Section 2.0 of this RI/RFI Work Plan on potential contamination in abiotic media at OU5. The potential contaminants of concern will be selected largely from these lists as part of the Tasks 1 and 2 efforts. Any additional data made available at any stage in the EE process will be incorporate at the time it becomes available.

**Comment:**

11. Section 9.1.2.1, p. 9-6, para. 3: The relevance of the information in the fourth sentence in this paragraph is not clear.

Provide more detail on the Talmage and Walton (1990) study.

**Response:**

The sentence provides a general description of the types of biomonitoring studies that have been conducted using metals.

Details such as those in the Talmage and Walton (1990) study will be evaluated as part of the Task 2 effort.

**Comment:**

12. Section 9.1.2, p. 9-7, Table 9-1: Provide sources for these data.

**Response:**

The source of these tables is Section 2.0, Tables 2-2 through 2-6, of this RI Work Plan. The source will be cited on the revised table.

**Comment:**

13. Section 9.1.2.1, p. 9-8, para. 2: The statement to the effect that AWQC "were established to be protective of all aquatic life forms" is not precisely correct. Please check to make sure the definition is correct.

**Response:**

The text has been revised to "Specifically, these criteria state the maximum allowable water concentrations consistent with the protection of aquatic life"; however, the statement was corrected as stated.

**Comment:**

14. Section 9.1.2.1, p. 9-8, para. 3: The phrase "detected at elevated" in the third sentence is not equivalent to "levels above Federal surface water quality standards." Concentrations can be at elevated levels and not above Federal standards. Please review this for consistency and accuracy.

**Response:**

This phrase has been deleted from the third sentence.

**Comment:**

15. Section 9.1.2.1, p. 9-9, Table 9-2: Provide sources for the data in this table.

**Response:**

See Tables 2-5 and 2-6 in Section 2.0 of this RI Work Plan. The source will be cited on the revised table.

**Comment:**

16. Section 9.1.2.2, p. 9-12, para. 1: The statement in the second sentence (beginning with "The same is true...) is not true for biota.

**Response:**

The sentence has been revised to " The same is true for effects on humans...".

**Comment:**

17. Section 9.1.2.2, p. 9-12, para. 2: The last sentence in this paragraph (beginning with "Based on the following...") has substantial implications for the OU5 EE. Please discuss.

**Response:**

This is discussed in the paragraphs following paragraph 2. It is unclear what DOE means by "substantial implications".

**Comment:**

18. Section 9.1.2.2, p. 9-12, para. 3: The references cited in this section (i.e., Pendleton, et al. 1965 and Hanson et al. 1967) are not in the bibliography.

**Response:**

These references have been added.

**Comment:**

19. Section 9.1.2.2, p. 9-13, paras. 3 & 4: The relevance of the information in these two paragraphs is questionable.

**Response:**

Comment noted. The information presented is a brief summary of available literature on radionuclide effects on biota.

**Comment:**

20. Section 9.1.2.2, p. 9-13, para. 5: The last sentence in this paragraph (beginning with "The authors also reported...") has substantial implications for the OU5 EE. Please discuss.

**Response:**

The authors of the paper reported that while they perceived changes in community composition, the methodologies they selected for measuring such changes were inadequate. EE methodologies and DQOs should be sufficiently sensitive to detect and quantitatively document such changes.

**Comment:**

21. Section 9.1.2.2, p. 9-14, paras. 1 & 2: The relevance of the information in these two paragraphs is questionable.

**Response:**

Comment noted. We believe that the information is relevant to scoping field studies.

**Comment:**

22. Section 9.1.2.2, p. 9-14, para. 3: The relevance of the statement in the last sentence (beginning with "One would expect very low...") is not clear. Is RFP being specifically discussed. If so, where did the data on contaminant concentrations in environmental media come from?

**Response:**

RFP is not being specifically discussed in this statement. The statement has been revised to "Because of low food-chain transfer factors for most uranics, low concentrations in water and sediments generally result in low concentrations of transuranics in vertebrate tissues."

**Comment:**

23. Section 9.1.3.2, p. 9-16, para. 4: What is going to be done with reference to the "candidate species for federal listing?" This paragraph indicates that there is an underlying assumption that the existing data are acceptable to "write off" these taxa. Indicate how the EE will address this issue of candidate taxa.

**Response:**

See p. 9-30, Section 9.2.3.5.

**Comment:**

24. Section 9.2, p. 9-16, para. 6: Cite the relevant portions of the NCP that support an EE.

**Response:**

Section 300.430(d) will be cited int he revised Work Plan.

**Comment:**

25. Section 9.2.1, p. 9-17, para. 3: DQOs cannot be developed until data gaps are identified (in Task 2).

Insert the following: ".. and development of a plan for obtaining..."

Provide more detail on the process of "obtaining consensus."

**Response:**

We disagree. According to EPA DQO guidance, the first steps in the Phase I DQO process include such steps as defining objectives for obtaining the data and identifying data users and uses. Data gaps are then identified by comparing these objectives to existing data.

Phrase inserted.

Consensus will be obtained among the various OU contractors.

**Comment:**

26. Section 9.2.1, p. 9-16, para. 4: All of these activities should have been conducted as part of the work plan development.

**Response:**

Based on the April 11 meeting with DOE and EPA, the efforts as outlined in this Work Plan are appropriate.

**Comment:**

27. Section 9.2.1.1, p. 9-17, para. 5: From what can the list of chemicals to be evaluated "be narrowed?"

Should selection criteria be "chemical and species specific?" Please explain.

The one criteria mentioned (likelihood of exposure) is a very strange choice.

**Response:**

The list should be narrowed from those contaminants known or suspected to occur at the site to those contaminants of concern to biota.

Yes, see Table 9-4.

If the likelihood for receptor species to be exposed is minimal (e.g., limited distribution of the contaminant or mobility of the receptor species), then the contaminant is not likely to be of concern. Potential for exposure is a fundamental (not strange) criterion under current EPA guidance.

**Comment:**

28. Section 9.2.1.1, p. 9-20, para. 1: Define the "selection process" mentioned in the first sentence.

The EPA EE manual does not appear to provide guidance for the selection of contaminants of concern.

**Response:**

See Section 8.2 of this EE Work Plan, Identification of Chemicals of Concern.

See Section 6.4 in EPA, Vol. II EE Manual, Describe Contaminants of Concern.

**Comments:**

29. Section 9.2.1.2, p. 9-20, para. 2: The first sentence in this paragraph gives one the impression that key receptor species are defined exclusively on the basis of sensitivity to particular contaminants. Is this true? If not, please modify.

**Response:**

Sensitivity is a major criterion. The subsequent material in the section adequately modifies this sentence.

**Comment:**

30. Section 9.2.1.2, p. 9-21, para. 3 & 4: This paragraph indicates that there is feedback from Task 3 to Task 1. The problem appears to be that these two paragraphs are out of place. They actually describe Task 3 activities, and should probably be moved to Section 9.2.3.

**Response:**

The paragraphs are not out of place. These activities are part of Task 2 and are done in conjunction with Task 3.

**Comment:**

31. Section 9.2.1.2, p. 9-21, para. 3: The first sentence indicated that the checklist of OU5 biota will be developed in conjunction with the ecological field inventory. What about the field surveys? Will they not provide information relevant to developing a checklist of OU5 biota?

Reference is made to the "species" in Table 9-5. Many of the taxa in Table 9-5 are not species.

**Response:**

An inventory or checklist of species is to be conducted as part of the field surveys.

"Species" has been changed to "taxon".

**Comment:**

31.(sic) Section 9.2.1.2, p. 9-21, para. 4: Are "food web analyses" and "possible tissue sampling" the only subsequent efforts? What about population densities? Cite the tasks and/or document work plan section where these subsequent efforts are discussed.

Describe the basis for the sample size requirements. What is going to be done with the tissues that will require sample size considerations.

**Response:**

The sentence has been revised to read "possible tissue sampling or other ecotoxicological analyses."

Tasks and Work Plan sections (9.2.9 and 9.2.10) are cited in the next sentence in paragraph 4.

See SOPs.

**Comment:**

32. Section 9.2.1.2, p. 9-22, Table 9-5: Many of the taxa in Table 9-5 are not species. Change "Receptor Species" to "Receptor Taxon."

**Response:**

"Species" has been changed to "taxon".

**Comment:**

33. Section 9.2.1.2, p. 9-23, para. 1: Where is the "final selection of contaminants of concern and key receptor species" to be conducted? Cite the specific task and work plan section.

**Response:**

These activities will be done as part of Task 1, Preliminary Planning and Conceptual Model Development.

**Comment:**

34. Section 9.2.1.3, p. 9-23, entire section: It is not at all clear how these reference areas will be used in the ecological evaluation. What role do they play? Is DOE talking about making impacts vs. reference area comparisons? Please clarify and/or elaborate.

**Response:**

Criteria for the selection of reference areas are being developed in the SOPs. Comparisons between impact and reference areas may be made depending on the measurement endpoints selected and could include effects on species, ecological endpoints (e.g., biomass), or contaminant concentrations in tissues.

**Comment:**

35. Section 9.2.1.3, p. 9-23, para. 3: The first sentence in this paragraph does not appear to make sense.

The sentence beginning with "For OU5, at least one..." indicates that comparisons of impacted areas with a single reference area may be planned. We would strongly encourage DOE to

reconsider this approach, since a single reference area can be hardly considered representative of the particular habitat type.

**Response:**

The sentence has been changed to "Reference areas need not be selected if current or historical data are available and suitable for the assessment of potential adverse effects." Reference area selection criteria will be addressed in SOPs. Depending on these criteria, reference areas may or may not be needed for the evaluation of contaminant "effects".

**Comment:**

36. Section 9.2.1.3, p. 9-23, para. 4: We strongly question whether reference areas can be selected based on the data available for the Task 1 assessment. DOE should assure the reader that such a selection process is defendable at this stage of the assessment.

**Response:**

Reference areas need not be selected in Task 1. Criteria for the selection of reference areas will be developed in Task 1; actual selection of reference areas, if needed, may not be made until Task 8 using SOPs.

**Comment:**

37. Section 9.2.1.4, p. 9-24, para. 1: This section is completely general and very confusing.

**Response:**

This section simply restates and follows EPA DQO guidance (EPA/600/3-89/013).

**Comment:**

38. Section 9.2.1.5, p. 9-24, para. 3: This section is very inadequate. At this stage of work plan development, DOE should be able to give generic methods and protocols for the field sampling design. Without some indication of design protocols we cannot adequately review the field program.

The first sentence in this paragraph is very strange.

**Response:**

Methods and protocols for the Field Sampling Plan are presented in Section 9.3, Field Sampling Plan and in the SOPs.

The first sentence has been deleted.

**Comment:**

39. Section 9.2.2, p. 9-25, entire section: Change the name of this section. Delete any references to a "Preliminary Risk Assessment." What is being done here is Conceptual (Risk) Model Development not a preliminary risk assessment.

Most of these Task 2 efforts should have been conducted as part of the work plan scoping and development.

Some of the Task 2 activities should be split out and integrated with Task 1 activities, since both are part of work plan scoping and development of the conceptual model.

**Response:**

The name of this section has been changed to "Conceptual Model Development."

Based on the April 11 meeting with DOE and EPA, the efforts as outlined in Tasks 1 and 2 are appropriate.

**Comment:**

40. Section 9.2.2, p. 9-25, para. 1: The second bullet indicates that data on the nature and extent of contamination will be available for Task 2 activities. Please describe the relationships between Task 2 and RI activities related to abiotic sampling, as well as between Task 2 and Task 3 sampling activities. Describe precisely how the data on the nature and extent of contamination will be used to design the Task 3 activities.

**Response:**

Task 3 field activities are being conducted in areas of known or suspected abiotic contamination. Additional information developed in Tasks 1 and 2 will be used to revise and refine the Task 3 field sampling effort, if necessary, and to reflect the iterative nature of RI activities.

**Comment:**

41. Section 9.2.2, p. 9-25, para 2: In general, discuss the central role of the availability of information on the nature and extent of contamination in conducting these integrated Task 2 & 3 activities.

The first bullet indicating that existing data will be used to develop a preliminary list of contaminants is not consistent with the second bullet of the previous paragraph (which indicated that data from Phase I efforts on the nature and extent of contamination in abiotic media will be available). If these data are available). If these data are available, why the reliance on historic data?

The second bullet dealing with initial toxicity testing, also implies that data on the nature and extent of contamination will be available. Please discuss this relationship.

With reference to the third bullet, are habitats not identified and characterized?

With reference to the fourth bullet, what about these plant and animal species will be characterized.

We suggest combining the fifth bullet with the fourth bullet. "General information" is too nebulous. Be specific about what population characteristics will be studied.

With reference to the sixth bullet, as far as we can tell, this is the only mention of "gut content analysis."

**Response:**

Both historical and current data, where available and adequate, will be used to the extent possible in Task 2 and Task 3 activities.

The initial toxicity testing efforts rely on available data only to the extent that it is used in the RI to establish sampling locations for the abiotic media. Initial toxicity testing is being conducted as a screening tool to help in the further determination of the nature and extent of contamination, particularly from complex chemical mixtures.

Plant and animal species will be characterized with respect to their potential exposure to contaminants.

Gut content analyses are possible, but until the pathways model is developed, it would be premature to propose conducting gut content analyses.

**Comment:**

42. Section 9.2.2.1, p. 9-26, entire section: This literature review should have been conducted as part of the RI work plan scoping and development activities.

The central role of a conceptual model in the organization and synthesis of historical data and identification of data gaps for Task 3 characterization should be recognized and discussed.

**Response:**

Based on the April 11 meeting with DOE, EPA and the State, the efforts as outlined by task in this Work Plan are appropriate.

Task 3 is an ecological field investigation. Implementation of these field surveys is not dependent on the identification of data gaps in Task 2.

**Comment:**

43. Section 9.2.2.2, p. 9-26, entire section: This literature review should have been conducted as part of the RI work plan scoping and development activities.

The central role of a conceptual model in the development of the site characterization should be recognized and discussed. The conceptual model would ensure that the site characterization discussion emphasizes those components that influence contaminant fate and transport.

**Response:**

Based on the April 11 meeting with DOE, EPA and the State, the efforts as outlined by task in this Work Plan are appropriate.

The conceptual model is the basis for the contamination assessment (Tasks 4 through 7) as discussed in sections 9.2.4 through 9.2.7).

**Comment:**

44. Section 9.2.2.2, p. 9-27, para. 3: What "current environmental studies" are being discussed herein.

**Response:**

Whatever studies are being conducted at the time this Work Plan is implemented. The text has been revised to "...current environmental studies at other operable units...".

**Comment:**

45. Section 9.2.3, p. 9-27, entire section: In the discussions of air quality, soils, surface water and sediments, and groundwater (i.e., Sections 9.2.3.1 - 9.2.3.4) please reference the sections of the RI Work Plan where these efforts are discussed in greater detail. If not, then these sections should be rewritten to include more detail.

**Response:**

Appropriate sections will be referenced.

**Comment:**

46. Section 9.2.3.2, p. 9-28, para. 3: The purpose of the Phase I RFI/RI of providing data "...for confirming the presence or absence of contamination" is inadequate.

**Response:**

The sentence restates the objectives as presented on p. ES-2 of this RI Work Plan.

**Comment:**

47. Section 9.2.3.2, p. 2-28, para. 4: This paragraph is a conceptual model discussion that should have been presented earlier.

**Response:**

This paragraph refers to the abiotic conceptual model and not the biota pathways conceptual model. The discussion is therefore appropriately presented in this section.

**Comment:**

48. Section 9.2.3.2 pp. 9-28 & 9-29, para. 5: The first sentence in this paragraph is strange. Why has this not already been done? Does DOE mean to say that the methods given in this work plan may not be adequate? Does DOE mean to say that the sampling plan for abiotic media characterization might be modified to take into account ecological evaluation needs? Will the data from the abiotic media characterization be available to locate EE sampling stations? Say exactly what you mean here.

**Response:**

The verb tense in the first sentence has been changed from " will be" to "have been". However, both the EE and the RI sampling programs proposed in this document may need review and modification prior to or during implementation of the field sampling efforts should new information on the occurrence of contamination at OU5 be obtained. Information obtained as part of the OU5 Task 1/Task 2 environmental evaluation efforts may also require reevaluation of the proposed abiotic field sampling program.

**Comment:**

49. Section 9.2.3.2, p. 9-29, para. 2: Why were the results in the Final Phase III OU1 RFI.RI Work Plan and Draft Final OU2 RFI/RI Work Plan not evaluated as part of the development of this Phase I RFI/RI Work Plan?

**Response:**

These were separate operable unit work plans written concurrently by different contractors.

**Comment:**

50. Section 9.2.3.5, p. 9-29, entire section: For the following subsections, the activities to be included in the qualitative "field surveys" have not differentiated from those collected in the quantitative "ecological inventory."

    For each subsection, discuss what will be done with the data? Why is each data type collected? How will it be used in impact or risk assessment?

**Response:**

The field surveys and ecological inventory are described in section 9.3, Field Sampling Plan.

**Comment:**

51. Section 9.2.3.5, p. 9-30, para 1: Explain how the "structure of the biological communities" can help "identify potential contaminant pathways".

**Response:**

Food web structures determine the exposure pathways by which contaminants bioaccumulate or biomagnify.

**Comment:**

52. Section 9.2.3.5, p. 9-30, para 2: Explain how these station locations for these toxicity tests will be selected. Discuss the role of information on the nature and extent of contamination will be used in this selection process.

**Response:**

A statement has been added to the text in Section 9.3.2.2 and 9.3.2.4 regarding rationale for the selection of sampling locations. These locations were selected on the basis of known or suspected contamination as described in Section 2.0 of this RI Work Plan.

**Comment:**

53. Section 9.2.3.5, p. 9-31, para. 3: What parameters will be measured for the benthic community?

**Response:**

See SOPs and the Field Sampling Plan (Section 9.3).

**Comment:**

54. Section 9.2.3.5, p. 9-31, para. 4: What will be done for the fish? This paragraph provides no useful information whatsoever.

**Response:**

See SOPs and the Field Sampling Plan (Section 9.3).

**Comment:**

55. Section 9.2.4, p. 9-32, entire section: Start this discussion with a summary of the information that is available at the initiation of Tasks 4-7. The relationship of Task 4-7 to the data/information collection activities is not entirely clear.

Does the "whittling down" of the list of contaminants of concern occur during Tasks 4-7? If so, please discuss in the appropriate sections.

**Response:**

We believe the relationship between Tasks 4 through 7 and Tasks 1 through 3 was made clear in section 9.1.1 and 9.2.4 and in Figure 9-1. Because the environmental evaluation is a phased and iterative process, these tasks are not necessarily distinct and independent activities as depicted.

The "whittling down" largely occurs in Task 2, where the preliminary contaminants of concern are identified. This is appropriately discussed in Sections 9.2.1.1 and 9.2.2.

**Comment:**

56. Section 9.2.4, p. 9-32, para. 4: The information in the second sentence of this paragraph regarding the integration of the program design with other ongoing RFI/RI studies is very important, particularly as related to the OU5 Phase I abiotic media characterization. Please elaborate.

**Response:**

This will be elaborated as part of the implementation of the field sampling programs.

**Comment:**

57. Section 9.2.6.1, p. 9-33, entire section: This is a conceptual modeling exercise. Please discuss.

**Response:**

Further discussion will be added to the text.

**Comment:**

58. Section 9.2.6.1, p. 9-34, para. 1: Describe the modeling efforts mentioned in the second sentence in this paragraph.

**Response:**

The sentence has been revised to "...will be evaluated and resultant data applied to the biota pathways model as appropriate".

**Comment:**

59. Section 9.2.6.2, p. 9-34, para 3: Is this the first use of the Phase I abiotic contamination characterization data? Explain how data on the nature and extent of contamination will be used to identify exposure points.

**Response:**

See Tables 9-1 and 9-2.

The data will be used to characterize source areas, contaminant release characteristics, and the potential for biota to contact or be exposed to levels of these contaminants which could possibly result in adverse effects as determined through the pathways model.

**Comment:**

60. Section 9.2.6.2, p. pp. 9-34 & 9-35, para. 4: Explain why transport and fate modeling might be needed. Be more specific as to the models to be utilized. Unless the potential models are selected early in the process, there is a risk that data needed to parameterize the model will not be collected.

It is not necessary under the NCP to conduct a "worst case" assessment.

**Response:**

Fate and transport modeling may be needed where actual environmental media sampling is not conducted. The need for such models and their types will be determined as part of the RI abiotic effort as necessary (see section 5.5).

**Comment:**

61. Section 9.2.6.3, p. 9-35, entire section: This section represents a major departure from the standard "quotient method" of ecological risk assessment. As such, it is very important that the methodologies for this work be presented in detail.

**Response:**

The pathways model is not so much a departure as it is an elaboration of the standard "quotient method". Details on these methodologies are presented in the cited references which were provided to DOE and in a case study soon to be published by EPA (see Federal Register, Vol. 56, No. 76, April 19, 1991, p. 16101).

**Comment:**

62. Section 9.2.6.3, p. 9-35, para. 1: What "site-specific analytical data" will be used in the estimation of chemical intake? Are concentrations of contaminants in abiotic media the only site-specific data of concern here?

**Response:**

Site-specific data on contaminant concentrations in surficial soils and surface water will be used in the estimation of chemical intake. Data from Tasks 2 and 3 will also be applied as appropriate.

Site-specific data on concentrations of contaminants in biotic media will also be of concern. These data will be collected as part of the Task 9 ecotoxicological investigation.

The sentence has been revised to "...site-specific analytical data on contaminant concentrations in abiotic and biotic media, ...".

**Comment:**

63. Section 9.2.7, p. 9-35, para. 3: The first sentence needs some clarification, particularly with reference to the two mentions of "exposure." Why is ecological data collected in Task 3 not considered in this assessment?

**Response:**

The first sentence has been clarified to "... integration of abiotic exposure concentrations...".

It is. Data collected in Task 3 provide the site-specific information necessary for the exposure and toxicity assessments.

**Comment:**

64. Section 9.2 7, p. 9-35, para. 4: This paragraph is critical because it appears to discuss the impact assessment methodology. Describe in detail the methodology for impact assessment. What endpoints will be utilized? What hypotheses will be tested? Where will these data be taken from? Discuss the implications of the "qualitative nature" of this characterization of adverse effects.

**Response:**

This paragraph discusses the criteria that are usable for assessing adverse effects, rather than the risk assessment methodology discussed under Tasks 4 through 7. Measurement endpoints, hypotheses, and data needs will be developed under Tasks 1 through 7.

Environmental evaluations are of a more "qualitative nature" than human risk assessments in that carcinogenic risk calculations are not made for biota and data for assessing adverse effects in biota are considerably more limited. Adverse effects on biota, however, can be quantified to an extent by using the pathways approach where data are available.

**Comment:**

65. Section 9.2.8, p. 9-36, entire section: This section is very general and quite incomplete.

**Response:**

Additional discussion will be added to this section. Further details on the uncertainty analyses will be developed as part of the field program implementation.

**Comment:**

66. Section 9.2.9, p. 9-36, para. 3: Explain the circumstances under which additional ecotoxicological studies might be needed. Discuss the selection of stations for this sampling effort.

**Response:**

The approach presented in this Environmental Evaluation Work Plan is both phased and iterative. Discussion on the selection of sampling stations for this effort is presented in the Field Sampling Plan in Section 9.3.

**Comment:**

67. Section 9.2.9, pp. 9-36 & 9-37, para. 4: Describe the types of quantitative data which could be provided in these ecotoxicological studies.

The bullet specific criteria are excellent, and will go a long way to determining the feasibility of the assessment. Now, good luck in finding responses that fit these criteria. Also, please address the multiple contaminant problem.

In the fifth bullet, "power" is 1 minus the Type II error, and the use of both in the sentence introduces redundancy. We suggest changing the "Type II error" to "Type I error." Under certain null hypotheses, the Type I error could be the more important.

**Response:**

Tissue analysis data, as indicated on p. 9-37, para. 1, could comprise much of the ecotoxicological data.

Field studies which are implemented without consideration of these response criteria are likely to be inadequate or provide data that are extraneous to the evaluation of potential risk.

In cases where contaminants are similar in effects and activity, then the effects will be considered as additive. Where data are available regarding synergistic effects, they will be considered.

"Type II" has been replaced with "Type I".

**Comment:**

68. Section 9.2.9, p. 9-37, para. 1: Where in OU5 are these samples to be collected? Discuss the rationale underlying the sample station selection process that will be employed in Task 9. Discuss the relationship of these station locations to the nature and extent of contamination. Discuss the technical objectives of the sampling effort. What relationship does DOE hope to make in this assessment? How will these efforts provide data useful to risk assessment or impact characterization?

**Response:**

Sampling locations are presented in Section 9.3, Field Sampling Plan. Sampling locations were largely located at or downgradient from areas of known or suspected contamination. The technical objective of the toxicity tests is to provide a screening mechanism to aid in the determination of nature and extent of contamination, particularly since there is the potential for exposure to mixtures of contaminants. EPA recognizes the usefulness of such toxicity testing as a means for integrating the effects of all toxic pollutants, which cannot be measured by chemical analysis.

**Comment:**

69. Section 9.2.9, p. 9-38, para. 1: The bullet items identifying data-related protocols to be employed in refining the field sampling plan are good. This field sampling plan should be a deliverable, and should be reviewed and approved prior to implementation of the Task 9 sampling program.

**Response:**

It will.

**Comment:**

70. Section 9.2.10, p. 9-38, para. 2: It is not clear how the tissue analysis will be used to assess impacts. This should be made obvious to the reader. Please discuss in detail. If the means is through the pathway model, please explain in some detail.

The suitability criteria given in the last sentence is different than those presented earlier for "key receptors." Please clarify. Is DOE referring only to key receptors in this sentence?

**Response:**

By comparing tissue analysis results to toxicological benchmark concentrations for that chemical such as $LC_{60}$ or MATC values, the potential for adverse effects in a population can be characterized.

Tissue analyses may or may not be used in conjunction with the pathways model depending upon the contaminant in question. The decision process for determining chemical sampling in tissues will be presented in greater detail in the revised work plan.

We believe this statement to be clear...if the species is not suitable for sampling, then it should not be sampled; likewise, if it is not a receptor species (key or otherwise), it should not be sampled. Also, a species can be "key" and may be affected by contaminants, yet contaminants may not accumulate in its tissues.

**Comment:**

71. Section 9.2.10, p. 9-38, para. 3: Discuss these samples for environmental media in greater detail. Under what conditions would these samples be collected? Is this discussion related to the Task 3 tissue collections? What strategy is to be employed as far as establishing dose-response relationships from these field data?

With regard to the last sentence, state plainly how the pathways model will be used to assess potential impacts.

**Response:**

The sentence has been revised to "environmental media samples (see Section 7.0)".

Tissue collections are more likely to be made under Task 9, unless sampling protocols are in place so that samples collected as part of the ecological investigation in Task 3 can be saved and used for tissue analysis.

Data obtained from the tissue sampling efforts would be used to calibrate/validate the pathways model. Laboratory toxicity testing to establish dose-response relationships are unlikely to be carried out as part of this environmental evaluation.

The following has been added to Section 9.2.6.3. The pathways approach uses a bioaccumulation model of contaminant transfer through a food web. The model links contamination in soil and water to contamination in biota. The pathways model approach blends standard environmental assessment methods with ecological and toxicological modelling to produce an integrated procedure for selecting indicator species and conducting an investigation of ecosystem effects resulting from contamination in soil and water. Where possible, uncertainty in the model is reduced by direct sampling.

**Comment:**

72. Section 9.2.10, p. 9-38, para. 4: Discuss the design of these statistical tests in some detail. Reference to DQOs is not satisfactory.

**Response:**

Statistical tests will be designed as part of the implementation of the field sampling efforts.

**Comment:**

73. Section 9.2.10, pp. 9-38 & 9-39, para. 5: The last sentence in the paragraph indicates that DOE will be very cautious in the selection of biological responses and the implementation of the impact characterization methodology. This approach is to be applauded. Please discuss where the data to evaluate these quantitative considerations will be derived. We presume most of these data come from the Task 3 ecological inventory efforts; however, the quantitative aspects of the Task 3 efforts were not adequately described, and the situation is not clear. Please discuss.

**Response:**

The data/information to evaluate these considerations will be derived starting in Tasks 1 and 2, as the conceptual model is developed, and will continue through the Contamination Characterization (Tasks 4 through 7) and Planning (Task 8) stages. The Task 3 ecological investigation will provide site-specific information on availability and suitability of species for testing as well as any direct observations of contaminant effects.

**Comment:**

74. Section 9.2.11, p. 9-39, para. 1: The statement that all relevant data will be "... integrated and evaluated in the characterization of potential environmental impacts" is not adequate. The key is <u>how</u> this characterization effort will be carried out. this methodology for risk assessment and impact characterization has not been adequately expressed in this work plan. Perhaps, as part

of Task 9, the could be a subsection on "Impact Characterization." That way, the would be something to say with regard to the seventh bullet topic in this paragraph.

**Response:**

Further discussion will be added to the text regarding the decision processes used in the chemical sampling of tissues, the use of reference areas for evaluating contaminants of concern in tissues, and for investigating individual, population, and ecosystem level effects, and for the use of reference areas for contaminant of concern effects. The word impact will be replaced with contamination in the seventh bullet so as not to confuse the reader.

**Comment:**

75. Section 9.2.11, p. 9-39, para. 3, and p. 9-43, para. 1: This section (titled "Remediation Criteria") seems to arrive unannounced. The use of the "validated" pathway trophic model for establishing remediation criteria has not been properly introduced. DOE should explain why this work is being conducted. What is the value of establishing remediation criteria to this environmental evaluation? Can this model actually be used to assess impacts?

Discuss the methodology for establishing ecological effects criteria (shown in Figure 9-2) in greater detail and with more clarity. Discuss the adequacy of the existing toxicology data base.

**Response:**

This section follows EPA guidance presented in section 6.7 on Remediation Criteria in the EPA Vol. II EE Guidance Document (EPA/540/1-89/001). The food web and pathways model approach as presented in this work plan provides a means of indirectly evaluating potential adverse "effects" that can then be investigated by appropriate sampling (i.e., model validation". The remediation criteria developed in the EE are of "value" in the feasibility and treatability studies where "action levels" for the cleanup of contaminated abiotic media are established.

The pathways methodology for determining remediation criteria is presented in Figure 9-2.

Section 9.2.5 has been revised to clarify that the adequacy of the existing toxicology data base will be evaluated under Task 4, Toxicity Assessment.

**Comment:**

76. Section 9.2.11, p. 9-43, para. 1: Some of the discussion in this paragraph is confusing. Particularly the sentence beginning with " the 'no effects' criteria levels..." How does the methodology take into account exposure to multiple contaminants? Discuss the feasibility of this methodology in light of the existing toxicology data base and the prospects for collecting enough tissues for chemical analyses.

Discuss how determination of these criteria for OU5 will be coordinated with other RFI/RI studies and EEs.

**Response:**

See response to Question #67.

The adequacy of the existing toxicology data base for those contaminants of concern and indicator species which are yet to be selected at RFP has not yet been evaluated. The pathways methodology will incorporate such data to the extent that they are available. The prospects for collecting enough tissue samples will be determined as part of the implementation of the field sampling efforts.

Such efforts will be coordinated on a site-wide basis by combining appropriate ecological field activities, eliminating overlap between adjacent operable units, and using the array of data available from RFI/RI investigations.

**Comment:**

76.(sic) Section 9.2.11, p. 9-43, para. 1: Discuss how the acceptable criteria will be used in conjunction with ARARs to evaluate potential adverse effects. Discuss the assessment of exposure to mixtures of contaminants.

**Response:**

The acceptable criteria levels are developed from the pathways model to assess adverse effects in those instances where no ARARs are available or where potential or possible ARARs are not appropriate. Where contaminant levels in abiotic media are above potential or possible ARARs or these criteria levels, adverse effects are considered likely.

See response to Question #67.

**Comment:**

77. Section 9.3, p. 9-43, para. 3: Discuss the role of information on the nature and extent of contamination (and particularly the results of the Phase I sampling of abiotic media contamination) in the design of the field sampling plan. Provide the general rationale underlying the selection of sampling stations.

**Response:**

The text has been revised to state that sampling stations were selected to coincide with sampling efforts in abiotic media and to characterize the biotic communities that are present in and downgradient from areas of known or suspected contamination.

The general rationale regarding the selection of sampling locations is presented in Section 9.3.2, Sample Location.

**Comment:**

78. Section 9.3, p. 9-44, para. 1: The SOPs identified by the first two bullets should be reviewed in detail before this sampling plan receives final approval.

**Response:**

The SOPs, as available, are being reviewed in conjunction with the approval of this sampling plan.

**Comment:**

79. Section 9.3.1, p. 9-44, para. 3: Describe the types of quantitative data to be collected during this sampling effort.

With reference to objective No. 2, should a criterion not be sensitive to the contaminants of concern? We believe this and other criteria were given earlier in this chapter.

Objective No. 4 appears to be very important in that it involves an appraisal of the value of the collected data for quantitative assessment. The process of "determining objectives, measurement endpoints and methodologies for Task 9 field/laboratory contamination studies" should be discussed in detail.

**Response:**

The types of quantitative data are described in Section 9.3.4, Field Survey and Inventory Sampling Methods as well as in the SOPs.

Determining sensitivity to contaminants is a criterion for identifying key receptor species and developing the conceptual model, but it is not an objective of the Ecological Field Investigation.

It would be premature to provide such details until the conceptual model is developed. Details will be provided as part of the risk or contamination characterization tasks.

**Comment:**

80. Section 9.3.1, p. 9-45, para. 2: This discussion of statistical tests is much too general. If sampling stations can be identified at this stage of the assessment, there must be a rationale underlying their selection. If there is a rationale, there are specific hypotheses to test. DOE should do a better job of explaining potential approaches to quantitative impacts assessments.

DOE should also stress the use of these quantitative data to establish sample sizes for acceptable levels of uncertainty.

**Response:**

Sampling stations were selected to coincide with sampling efforts in abiotic media and to characterize the biotic communities that are present. The intent of these selected locations was not to test specific hypotheses regarding the effects of contamination, but to characterize the ecological communities that are present and provide site-specific input to the pathways model.

Appropriate statistical tests are being used to assure sample adequacy and an acceptable level of uncertainty (see section 9.3.4.1 and SOPs).

**Comment:**

81. Section 9.3.2, p. 9-45, entire section: Discuss the use of information on the nature and extent of contamination of abiotic media on the selection of sampling stations. It appears from this discussion that very little of this type of information will be available for at least the first ecological inventory and toxicity testing efforts (May-June period).

For all subsections which follow (i.e., Sections 9.3.2.1 to 9.3.2.5), discuss the general rationale for the location of sampling stations.

**Response:**

See response to Comment #80. All available data will be used as appropriate.

**Comment:**

82. Section 9.3.2.1, p. 9-46, para. 3: Why was this Univ. of Colorado vegetation map not discussed earlier, and used to design the Task 3 ecological inventory?

**Response:**

Although useful as a reference map, the Univ. of Colorado map was produced 20 years ago and is considered to be outdated and in some cases inaccurate.

**Comment:**

83. Section 9.3.2.1, p. 9-16, para. 4: This discussion of transects is a little confusing, and would be greatly enhanced by the use of a figure showing the orientation of the transects and their relationship to sampling stations of abiotic media.

Define the criteria for determining an "adequate number" or "adequate sample size," and how this will be implemented in the field. Is adequacy based on a species-area type relationship, or does adequate refer to an acceptable variability of a population parameter (e.g., density) or community of measure (species diversity)? Please explain.

**Response:**

The orientation of the transects at each of the IHSSs cannot be shown on a map as they will be randomly selected at the time of the field investigation.

See page 9-51 for sample adequacy formula.

**Comment:**

84. Section 9.3.3, p. 9-50, para. 1: The first sentence indicated that reference areas will be established only for tissue analysis studies. What about other parameters, such as species diversity, population densities, productivity etc.?

Statements to the effect that selection of "... reference areas may be based on criteria developed in the Task 1 preliminary planning process..." is very confusing. Why is the uncertainty here?

We are concerned that referenced areas can be identified based on the qualitative field surveys of Task 3. Was this the plan?

**Response:**

Decision trees for determining the use of reference areas will be added to the revised work plan. Unless a direct cause-effect relationship can be determined and distinguished from other background "noise" or disturbance factors, such parameters as population density and productivity are unlikely to be selected as measurement endpoints and necessitate the selection of a reference area(s).

Reference areas may be selected based on criteria developed in Task 1 or on criteria developed later in the risk assessment process.

Reference areas will be selected based on measurement endpoints using data developed in the field surveys, they will not be selected simply on the basis of the field surveys.

**Comment:**

85. Section 9.3.2.4, p. 9-51, para. 3: Is 10 meters the entire length of the transect? If not, different lengths on the same transect should not be considered individual samples as they are not selected independently of each other.

Is "total herbaceous cover/total fresh weight biomass" a ratio of two parameters or does DOE mean two separate parameters (i.e., total herbaceous cover and total fresh weight biomass). If the former, cite a reference for the use of this ratio.

Describe how Type I and II errors are controlled through the use of this sample size formula.

**Response:**

"Ten meters" has been deleted as the distance of the transect is randomly selected up to 10 meters as stated in section 9.3.2.1.

The latter. The "/" has been deleted and replaced with "and".

Type I and Type II errors are not controlled through the use of this sample size formula, they are controlled through the use of the specified level of significance.

**Comment:**

86. Section 9.3.4.2, p. 9-51, para. 4: Discuss how these (mainly) qualitative data on terrestrial wildlife and invertebrates will be of use in impact assessment. Be specific.

**Response:**

These data will primarily be used to characterize the biotic communities that are present are RFP and to determine key species, and not, necessarily, as measurement endpoint(s) in the assessment of adverse effects from the contaminants on receptor species. Where appropriate, these data will be used in the pathways model.

**Comment:**

87. Section 9.3.4.2, pp. 9-52 & 9-53, para. 1: This "quantitative information" appears to be mainly qualitative, at least as far a populations are concerned. Discuss how these (mainly) qualitative data will be used in impact assessment.

**Response:**

They will be used to the extent that they are appropriate to the selected measurement endpoint and pathways model. Additional rationale should be included in SOPs.

**Comment:**

88. Section 9.3.4.3, p. 9-53, para. 1: Delete the reference to "selected locations along Woman Creek" etc. This was discussed in Section 9.3.2.2.

Is algal density on a per species basis? If so, add qualifier "of each taxon."

How many replicate samples well be collected at each station?

**Response:**

Text deleted.

Yes, qualifier added.

Three.

**Comment:**

89. Section 9.3.4.4, p. 9-54, para. 1: Why were 3 replicates selected?

With regard to the first bullet, how is the fact that taxa will be identified only to genus consistent with doing species-specific toxicity evaluation? In Table 9-5 there was misuse of the term "receptor species." All of the taxa listed for the macroinvertebrates on this table were families or higher taxa groupings. None were species or genera. Is all this consistent?

**Response:**

Standard practice.

Species-specific toxicity evaluations for macrobenthos are usually performed as bioassays, not by field sampling.

"Species has been changed to "taxon" in Table 9-5.

**Comment:**

90. Section 9.3.4.4, p. 9-54, para. 2: If the taxonomic determination is only to genus, how can you calculate species diversity? DOE probably means taxa diversity. DOE ought to ensure that a consistent level of taxonomic identification and counting is employed throughout the study at all stations for each major taxa group.

References to "pollution-tolerant and pollution-sensitive taxa" seem questionable. By pollution, does DOE mean such things as eutrophication? If so, these categories may not be particularly relevant to this assessment.

**Response:**

Text corrected.

"Pollution-tolerant and pollution-sensitive taxa" has been deleted. Such determinations where appropriate will be made as part of the contamination characterization tasks.

**Comment:**

91. Section 9.3.4.5, p. 9-54, para. 3 & 4: This effort includes on gut content analysis. Is this consistent with statements made earlier in Section 9?

The data described herein appears to be basically worthless for impact assessment. Explain how these data will be used to characterize impacts.

**Response:**

Yes.

These data will primarily be used for community characterization. Age/length and age/weight relationships can provide useful data on growth-related contaminant effects and have been used in this context at other hazardous waste sites.

**Comment:**

92. Section 9.3.6, p. 9-55, para. 2: Discuss the implications of these tissue sample requirements. The clear indication is that these analyses will be conducted on a species-specific basis. It has already been shown in Section 9.3.4.4 that species of benthos will not be identified. We find it unlikely that adequate sized tissue samples can be acquired for periphyton and benthos "species." Yet acquisition of species-specific tissue samples is required for implementation of the criteria development activities. Perhaps DOE should consider grouping taxa into trophic groups for tissue analysis. By pooling the biological material on the basis of trophic grouping, enough biomass may be obtained for tissue analysis.

Discuss the possible need for analysis of tissue for organic contaminants.

What is the difference in "macrobenthos" and "benthos?"

**Response:**

It is unlikely that tissue analyses will be conducted on periphyton or macrobenthos given the large sample size requirements. Tissue sampling will be conducted on "key receptor" species or taxa as determined by the conceptual model only where samples sizes are adequate as determined by the ecological field surveys and where collection of such tissues would not impact the populations present. "The acquisition of species-specific tissue samples is required

for implementation of the criteria development activities" is correct but not complete. Intermediate stages in food chains need not meet this requirement.

See Section 9.2.10.

"Benthos" has been deleted.

**Comment:**

93. Section 9.4, pp. 9-55 & 9-56, para. 6: According to Figure 9-4, Task 100 scoping activities will take two months to complete, while Task 200 activities will require up to four months to complete. Ecological field surveys will not be initiate until Month 3. Given it is now mid-April, it is unlikely that any field activities would begin before July 1st. The May-June period for ecological inventory sampling and toxicity testing does not seem realistic given the need to complete the scoping activities before field sampling can be initiated.

**Response:**

As the text indicates, this schedule presented the timeframe in which the activity will occur and not necessarily the amount of time necessary to complete the task. Conduct of Task 3 is not dependent on the completion of Tasks 1 and 2. Based on agency input at the 11 April 1991 meeting and additional guidance to be provided in agency comments, the schedule will be adjusted.